APRIL/MAY 2023

DEPH42A — CRYSTAL GROWTH AND THIN FILMS

Time : Three hours Maximum : 75 marks

Shanmuga Industries Arts & Science College
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SECTION A — (10 × 2 = 20 marks)

Answer ALL the questions.

1. What is meant by supersaturation?

2. Distinguish between homogeneous and heterogeneous nucleation in crystal growth.

3. Differentiate PVD and CVD.

4. List out the significance of gel growth.

5. State Pauling's rule.

6. What do you understand about the voids in the crystal structure?

7. List out the applications of ion implantation.

8. What is meant by epitaxy?

9. What is meant by Laue pattern?

10. Distinguish between SEM and TEM.

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SECTION B — ($5 \times 5 = 25$ marks)

Answer ALL the questions.

11. (a) Explain in detail about the BCF theory.

Or

(b) Discuss the formation of spherical shape nucleus.

12. (a) Discuss Verneuil technique and give its significance.

Or

(b) Explain hydrothermal technique with schematic diagram.

13. (a) Write a note on point groups and space groups.

Or

(b) Discuss the various types of symmetry elements and symmetry operations present in a cubic crystal.

14. (a) How thin films can be prepared by electrodeposition technique.

Or

(b) How films can be prepared by pulsed laser deposition technique.

15. (a) Discuss the principle of EDAX.

Or

(b) Write a short note on etching.

SECTION C — ($3 \times 10 = 30$ marks)

Answer any THREE questions.

16. Derive Gibb's Thomson equation.

17. Explain the Czochralski technique for growing big crystals and list out its advantages and disadvantages.

18. Describe the various types of defects in crystals.

19. Explain the sol-gel method? What are the advantages and disadvantages of sol-gel synthesis technique?

20. Explain the working principle of FTIR spectroscopy with a neat diagram.
